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Distribution of Phytoplankton in Arizona Lakes

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This is a data report presenting the species and abundance of phytoplankton in the 11 lakes sampled by the National Eutrophication Survey in the State of Arizona. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

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DISTRIBUTION OF PHYTOPLANKTON IN ARIZONA LAKES

by

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FOREWORD

Protection of the environment requires effective regulatory actions which are based on sound technical and scientific information. This information must include the quantitative description and linking of pollutant sources, transport mechanisms, interactions, and resulting effects on man and his environment. Because of the complexities involved, assessment of specific pollutants in the environment requires a total systems approach which transcends the media of air, water, and land. The Environmental Monitoring and Support Laboratory-Las Vegas contributes to the formation and enhancement of a sound monitoring data base for exposure assessment through programs designed to:

- develop and optimize systems and strategies for monitoring pollutants and their impact on the environment
- demonstrate new monitoring systems and technologies by applying them to fulfill special monitoring needs of the Agency's operating programs

This report presents the species and abundance of phytoplankton in the 11 lakes sampled by the National Eutrophication Survey in the State of Arizona, along with results from the calculation of several commonly used biological indices of water quality and community structure. These data can be used to biologically characterize the study lakes, and as baseline data for future investigations. This report was written for use by Federal, State, and local governmental agencies concerned with water quality analysis, monitoring, and/or regulation. Private industry and individuals similarly involved with the biological aspects of water quality will find the document useful. For further information contact the Water and Land Quality Branch, Monitoring Operations Division.

George B. Morgan
Director
Environmental Monitoring and Support Laboratory
Las Vegas

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INTRODUCTION

The collection and analysis of phytoplankton data were included in the National Eutrophication Survey in an effort to determine relationships between algal characteristics and trophic status of individual lakes.

During spring, summer, and fall of 1975, the Survey sampled 156 lakes in 11 states. Over 450 algal species and varieties were identified and enumerated from the 430 water samples examined.

This report presents the species and abundance of phytoplankton in the 11 lakes sampled in the State of Arizona (Table 1). The Nygaard's Trophic State (Nygaard 1949), Palmer's Organic Pollution (Palmer 1969), and species diversity and abundance indices are also included.

TABLE 1. LAKES SAMPLED IN THE STATE OF ARIZONA

STORET No.	Lake Name	County
0401	Big Lake	Apache
0402	Fools Hollow	Navajo
0403	Lake Havasu	Mohave (San Bernadino in Calif.)
0404	Luna Lake	Apache
0405	Lyman Lake	Apache
0406	Lake Mohave	Mohave (Clark in Nev.)
0407	Lake Pleasant	Yavapai, Maricopa
0408	Lake Powell	Coconino (Kane, Garfield, San Juan in Utah)
0409	Rainbow Lake	Navajo
0410	Roosevelt Lake	Gila
0411	San Carlos Reservoir	Graham, Gila

MATERIALS AND METHODS

LAKE AND SITE SELECTION

Lakes and reservoirs included in the Survey were selected through discussions with State water pollution agency personnel and U.S. Environmental Protection Agency Regional Offices (U.S. Environmental Protection Agency 1975). Screening and selection strongly emphasized lakes with actual or potential accelerated eutrophication problems. As a result, the selection was limited to lakes:

(1) impacted by one or more municipal sewage treatment plant outfalls either directly into the lake or by discharge to an inlet tributary within approximately 40 kilometers of the lake;

(2) 40 hectares or larger in size; and

(3) with a mean hydraulic retention time of at least 30 days.

Specific selection criteria were waived for some lakes of particular State interest.

Sampling sites for a lake were selected based on available information on lake morphometry, potential major sources of nutrient input, and on-site judgment of the field limnologist (U.S. Environmental Protection Agency 1975). Primary sampling sites were chosen to reflect the deepest portion of each major basin in a test lake. Where many basins were present, selection was guided by nutrient source information on hand. At each sampling site, a depth-integrated phytoplankton sample was taken. Depth-integrated samples were uniform mixtures of water from the surface to a depth of 15 feet (4.6 meters) or from the surface to the lower limit of the photic zone representing 1 percent of the incident light, whichever was greater. If the depth at the sampling site was less than 15 feet (4.6 meters), the sample was taken from just off the bottom to the surface. Normally, a lake was sampled three times in 1 year, providing information on spring, summer, and fall conditions.

SAMPLE PREPARATION

To preserve the sample 4 milliliters (ml) of Acid-Lugol's solution (Prescott 1970) were added to each 130-ml sample from each site at the time of collection. The samples were shipped to the Environmental Monitoring and Support Laboratory, Las Vegas, Nevada, where equal volumes from each site

were mixed to form two 130-ml composite samples for a given lake. One composite sample was put into storage and the other was used for the examination.

Prior to examination, the composite samples were concentrated by the settling method. Solids were allowed to settle for at least 24 hours prior to siphoning off the supernate. The volume of the removed supernate and the volume of the remaining concentrate were measured and concentrations determined. A small (8-ml) library subsample of the concentrate was then taken. The remaining concentrate was gently agitated to resuspend the plankton and poured into a capped, graduated test tube. If a preliminary examination of a sample indicated the need for a more concentrated sample, the contents of the test tube were further concentrated by repeating the settling method. Final concentrations varied from 15 to 40 times the original.

Permanent slides were prepared from concentrated samples after analysis was complete. A ring of clear Karo® corn syrup with phenol (a few crystals of phenol were added to each 100 ml of syrup) was placed on a glass slide. A drop of superconcentrate from the bottom of the test tube was placed in the ring. This solution was thoroughly mixed and topped with a coverglass. After the syrup at the edges of the coverglass had hardened, the excess was scraped away and the mount was sealed with clear fingernail polish. Permanent diatom slides were prepared by drying sample material on a coverglass, heating in a muffle furnace at 400° C for 45 minutes, and mounting in Hyrax®. Finally, the mounts were sealed with clear fingernail polish.

Backup samples, library samples, permanent sample slides, and Hyrax®-mounted diatom slides are being stored and maintained at the Environmental Monitoring and Support Laboratory-Las Vegas.

EXAMINATION

The phytoplankton samples were examined with the aid of binocular compound microscopes. A preliminary examination was performed to precisely identify and list all forms encountered. The length of this examination varied depending on the complexity of the sample. An attempt was made to find and identify all of the forms present in each sample. Often forms were observed which could not be identified to species or to genus. Abbreviated descriptions were used to keep a record of these forms (e.g., lunate cell, blue-green filament, Navicula #1). Diatom slides were examined using a standard light microscope. If greater resolution was essential to accurately identify the diatoms, a phase-contrast microscope was used.

After the species list was compiled, phytoplankton were enumerated using a Neubauer Counting Chamber with a 40X objective lens and a 10X ocular lens. All forms within each field were counted. The count was continued until a minimum of 100 fields had been viewed, or until the dominant form had been observed a minimum of 100 times.

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QUALITY CONTROL

Project phycologists performed internal quality control intercomparisons regularly on 7 percent of the species identification and counts. Although an individual had primary responsibility for analyzing a sample, taxonomic problems were discussed among the phycologists.

Additional quality control checks were performed on the Survey samples by Dr. G. W. Prescott of the University of Montana at the rate of 5 percent. Quality control checks were made on 75 percent of these samples to verify species identifications while checks were made on the remaining 25 percent of the samples to verify genus counts. Presently, the agreement between quality control checks for species identification and genus enumerations is satisfactory.

RESULTS

A phytoplankton species list for the State is presented in Appendix A. Appendix B summarizes all of the phytoplankton data collected from the State by the Survey. The latter is organized by lake, and includes an alphabetical phytoplankton species list with concentrations for individual species given by sampling date. Results from the application of several indices are presented (Nygaard's Trophic State, Palmer's Organic Pollution, and species diversity and abundance). Each lake has been assigned a four-digit STORET number. (STORET (STOrage and RETrieval) is the U.S. Environmental Protection Agency's computer system which processes and maintains water quality data.) The first two digits of the STORET number identify the State; the last two digits identify the lake.

NYGAARD'S TROPHIC STATE INDICES

Five indices devised by Nygaard (1949) were proposed under the assumption that certain algal groups are indicative of levels of nutrient enrichment. These indices were calculated in order to aid in determining the surveyed lakes' trophic status. As a general rule, Cyanophyta, Euglenophyta, centric diatoms, and members of the Chlorococcales are found in waters that are eutrophic (rich in nutrients), while desmids and many pennate diatoms generally cannot tolerate high nutrient levels and so are found in oligotrophic waters (poor in nutrients).

In applying the indices to the Survey data, the number of taxa in each major group was determined from the species list for each sample. The ratios of these groups give numerical values which can be used as a biological index of water richness. The five indices and the ranges of values established for Danish lakes by Nygaard for each trophic state are presented in Table 2. The appropriate symbol, (E) eutrophic and (O) oligotrophic, follows each calculated value in the tables in Appendix B. A question mark (?) following a calculated value in these tables was entered when that value was within the range of both classifications.

PALMER'S ORGANIC POLLUTION INDICES

Palmer (1969) analyzed reports from 165 authors and developed algal pollution indices for use in rating water samples with high organic pollution. Two lists of organic-pollution-tolerant forms were prepared, one containing 20 genera, the other, 20 species (Tables 3 and 4). Each form was assigned a pollution index number ranging from 1 for moderately tolerant forms to 6 for

TABLE 2. NYGAARD'S TROPHIC STATE INDICES ADAPTED FROM HUTCHINSON (1967)

Index	Calculation	Oligotrophic	Eutrophic
Myxophycean	$\frac{\text{Myxophyceae}}{\text{Desmideae}}$	0.0-0.4	0.1-3.0
Chlorophycean	$\frac{\text{Chlorococcales}}{\text{Desmideae}}$	0.0-0.7	0.2-9.0
Diatom	$\frac{\text{Centric Diatoms}}{\text{Pennate Diatoms}}$	0.0-0.3	0.0-1.75
Euglenophyte	$\frac{\text{Euglenophyta}}{\text{Myxophyceae + Chlorococcales}}$	0.0-0.2	0.0-1.0
Compound	$\frac{\text{Myxophyceae + Chlorococcales + Centric Diatoms + Euglenophyta}}{\text{Desmideae}}$	0.0-1.0	1.2-25

TABLE 3. ALGAL GENUS POLLUTION INDEX (Palmer 1969)

Genus	Pollution Index
Anacystis	1
Ankistrodesmus	2
Chlamydomonas	4
Chlorella	3
Closterium	1
Cyclotella	1
Euglena	5
Gomphonema	1
Lepocinclis	1
Melosira	1
Micractinium	1
Navicula	3
Nitzschia	3
Oscillatoria	5
Pandorina	1
Phacus	2
Phormidium	1
Scenedesmus	4
Stigeoclonium	2
Synedra	2

TABLE 4. ALGAL SPECIES POLLUTION INDEX (Palmer 1969)

Species	Pollution Index
Ankistrodesmus falcatus	3
Arthrospira jenneri	2
Chlorella vulgaris	2
Cyclotella meneghiniana	2
Euglena gracilis	1
Euglena viridis	6
Gomphonema parvulum	1
Melosira varians	2
Navicula cryptocephala	1
Nitzschia acicularis	1
Nitzschia palea	5
Oscillatoria chlorina	2
Oscillatoria limosa	4
Oscillatoria princeps	1
Oscillatoria putrida	1
Oscillatoria tenuis	4
Pandorina morum	3
Scenedesmus quadricauda	4
Stigeoclonium tenue	3
Synedra ulna	3

extremely tolerant forms. Palmer based the index numbers on occurrence records and/or where emphasized by the authors as being especially tolerant of organic pollution.

In analyzing a water sample, any of the 20 genera or species of algae present in concentrations of 50 per milliliter or more are recorded. The pollution index numbers of the algae present are totaled, providing a genus score and a species score. Palmer determined that a score of 20 or more for either index can be taken as evidence of high organic pollution, while a score of 15 to 19 is taken as probable evidence of high organic pollution. Lower figures suggest that the organic pollution of the sample is not high, that the sample is not representative, or that some substance or factor interfering with algal persistence is present and active.

SPECIES DIVERSITY AND ABUNDANCE INDICES

"Information content" of biological samples is being used commonly by biologists as a measure of diversity. Diversity in this connection means the degree of uncertainty attached to the specific identity of any randomly selected individual. The greater the number of taxa and the more equal their proportions, the greater the uncertainty, and hence, the diversity (Pielou 1966). There are several methods of measuring diversity, e.g., the formulas given by Brillouin (1962) and Shannon and Weaver (1963). The method which is appropriate depends on the type of biological sample on hand.

Pielou (1966) classifies the types of biological samples and gives the measure of diversity appropriate for each type. The Survey phytoplankton samples are what she classifies as larger samples (collections in Pielou's terminology) from which random subsamples can be drawn. According to Pielou, the average diversity per individual (H) for these types of samples can be estimated from the Shannon-Wiener formula (Shannon and Weaver 1963):

$$H = -\sum_{i=1}^{S} P_i \log_x P_i$$

where P is the proportion of the ith taxon in the sample, which is calculated from n_i/N; n_i is the number of individuals per milliliter of the ith taxon; N is the total number of individuals per ml; and S is the total number of taxa. However, Basharin (1959) and Pielou (1966) have pointed out that H calculated from the subsample is a biased estimator of the sample H, and if this bias is to be accounted for, we must know the total number of taxa present in the sample since the magnitude of this bias depends on it.

Pielou (1966) suggests that if the number of taxa in the subsample falls only slightly short of the number in the larger sample, no appreciable error will result in considering S, estimated from the subsample, as being equal to the sample value. Even though considerable effort was made to find and identify all taxa, the Survey samples undoubtedly contain a fair number of rare phytoplankton taxa which were not encountered.

In the Shannon-Wiener formula, an increase in the number of taxa and/or an increase in the evenness of the distribution of individuals among taxa will increase the average diversity per individual from its minimal value of zero. Sager and Hasler (1969) found that the richness of taxa was of minor importance in determination of average diversity per individual for phytoplankton and they concluded that phytoplankton taxa in excess of the 10 to 15 most abundant ones have little effect on H. This was verified by our own calculations. Our counts are in number per milliliter and since logarithms to the base 2 were used in our calculations, H is expressed in units of bits per individual. When individuals of a taxon were so rare that they were not counted, a value of 1/130 per milliliter or 0.008 per milliliter was used in the calculations since at least one individual of the taxon must have been present in the collection.

A Survey sample for a given lake represents a composite of all phytoplankton collected at different sampling sites on the lake during a given sampling period. Since the number of samples (M) making up a composite is a function of both the complexity of the lake sampled and its size, it should affect the richness-of-taxa component of the diversity of our phytoplankton collections. The maximum diversity (MaxH) (i.e., when the individuals are distributed among the taxa as evenly as possible) was estimated from $\log_2 S$ (Pielou 1966), while the minimum diversity (MinH), was estimated from the formula:

$$MinH = -\frac{S-1}{N}\log_2\frac{1}{N} - \frac{N-(S-1)}{N}\log_2\frac{N-(S-1)}{N}$$

given by Zand (1976). The total diversity (D) was calculated from HN (Pielou 1966). Also given in Appendix B are L (the mean number of individuals per taxa per milliliter) and K (the number of individuals per milliliter of the most abundant taxon in the sample).

The evenness component of diversity (J) was estimated from H/MaxH (Pielou 1966). Relative evenness (RJ) was calculated from the formula:

$$RJ = \frac{H-MinH}{MaxH-MinH}$$

given by Zand (1976). Zand suggests that RJ be used as a substitute for both J and the redundancy expression given by Wilhm and Dorris (1968). As pointed out by Zand, the redundancy expression given by Wilhm and Dorris does not properly express what it is intended to show, i.e., the position of H in the range between MaxH and MinH. RJ may range from 0 to 1; being 1 for the most even samples and 0 for the least even samples.

Zand (1976) suggests that diversity indices be expressed in units of "sits", i.e., in logarithms to base S (where S is the total number of taxa in the sample) instead of in "bits", i.e., in logarithms to base 2. Zand points out that the diversity index in sits per individual is a normalized number ranging from 1 for the most evenly distributed samples to 0 for the least evenly distributed samples. Also, it can be used to compare different samples, independent of the number of taxa in each. The diversity in bits per

individual should not be used in direct comparisons involving various samples which have different numbers of taxa. Since MaxH equals log S, the expression in sits is equal to $\log_S S$, or 1. Therefore diversity in sits per individual is numerically equivalent to J, the evenness component for the Shannon-Wiener formula.

SPECIES OCCURRENCE AND ABUNDANCE

The alphabetic phytoplankton species list for each lake, presented in Appendix B, gives the concentrations of individual species by sampling date. Concentrations are in cells, colonies, or filaments (CEL, COL, FIL) per milliliter. An "X" after a species name indicates that the species identified in the preliminary examination was in such a low concentration that it did not appear in the count. A blank space indicates that the organism was not found in the sample collected on that date. Column S is used to designate the examiner's subjective opinion of the five dominant taxa in a sample, based upon relative size and concentration of the organism. The percent column (%C) presents, by abundance, the percentage composition of each taxon.

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APPENDIX A

PHYTOPLANKTON SPECIES LIST FOR THE STATE OF ARIZONA

Achnanthes
Actinastrum
Anabaena
Anabaenopsis circularis
Anabaenopsis raciborskii
Ankistrodesmus falcatus
Ankistrodesmus falcatus
v. *acicularis*
Ankistrodesmus falcatus
v. *mirabilis*
Aphanizomenon flos-aquae
Aphanocapsa
Aphanothece
Arthrospira jenneri
Asterionella formosa
Binuclearia tatrana
Botryococcus braunii
Carteria
Ceratium hirundinella
Ceratium hirundinella
f. *brachyceras*
Chlamydomonas
Chlorogonium
Chroococcus dispersus
Closterium
Cocconeis placentula
Coelastrum microporum
Coelastrum reticulatum
Coelastrum sphaericum
Coelosphaerium naegelianum
Cosmarium
Crucigenia rectangularis
Crucigenia tetrapedia
Cryptomonas erosa
Cryptomonas marsonii
Cryptomonas ovata
Cryptomonas reflexa
Cyclotella meneghiniana
Cylindrotheca gracilis
Cymatopleura solea
Cymbella cuspidata
Cymbella mexicana
Cymbella minuta
Dactylococcopsis
Diatoma vulgare
Diatoma vulgare
v. *breve*
Dictyosphaerium pulchellum
Dinobryon divergens
Dinobryon sertularia
Dinobryon sociale
Dinobryon sociale
v. *americanum*
Diplopsalis acuta
Elakatothrix gelatinosa
Elakatothrix viridis
Epithemia sorex
Euglena acus
Euglena tripteris
Fragilaria capucina
v. *mesolepta*
Fragilaria crotonensis
Glenodinium edax
Glenodinium gymnodinium
v. *biscutelliforme*
Glenodinium oculatum
Gomphonema intricatum
Gomphonema truncatum
Gomphonema truncatum
v. *capitatum*
Gomphonema ventricosum
Gymnodinium ordinatum
Gyrosigma
Kirchneriella
Lagerheimia ciliata
Lagerheimia citriformis
Lagerheimia quadriseta
Lepocinclis playfairiana
Lyngbya contorta
Mallomonas acaroides
Mastogloia grevillei
Melosira distans
Melosira granulata
v. *angustissima* f. *spiralis*
Melosira italica
Melosira varians
Meridion circulare
v. *constrictum*
Merismopedia minima
Merismopedia tenuissima
Mesostigma viridis
Microcystis aeruginosa
Microcystis incerta
Mougeotia
Navicula cuspidata
Navicula tripunctata
Nephrocytium agardhianum
Nitzschia
Oedogonium
Oocystis eremosphaeria
Oscillatoria limnetica
Oscillatoria prolifica

Oscillatoria rubescens
Oscillatoria tenuis
Pandorina morum
Pediastrum angulosum
Pediastrum boryanum
Pediastrum duplex
v. *clathratum*
Pediastrum simplex
v. *duodenarium*
Pediastrum tetras
Pediastrum tetras
v. *tetraodon*
Peridinium elpatiewsky
Peridinium inconspicuum
Peridinium quadridens
Peridinium willei
Phacus acuminatus
v. *drezepolskii*
Phacus megalopsis
Phacus pleuronectes
Phacus pseudonordstedtii
Phacus tortus
Phormidium mucicola
Pinnularia
Pteramonas
Raphidiopsis curvata
Rhopalodia gibba
Scenedesmus abundans
Scenedesmus acuminatus
Scenedesmus acutus
Scenedesmus bicaudatus
Scenedesmus bijuga
Scenedesmus dimorphus
Scenedesmus intermedius
Scenedesmus ovalternus
Scenedesmus quadricauda
Schroederia judayi
Schroederia setigera
Skeletonema potamos
Sphaerocystis schroeteri
Spirulina major
Staurastrum pachyrhynchum
Staurastrum tetracerum
Stauroneis
Stephanodiscus niagarae
Surirella angustata
Surirella ovata
Synedra acus
Synedra rumpens
Synedra ulna
Tetraedron caudatum
Tetraedron caudatum
v. *longispinum*
Tetraedron constrictum
Tetraedron minimum
v. *scrobiculatum*
Tetraedron pentaedricum
Tetraedron regulare
Tetrastrum glabrum
Tetrastrum staurogeniaeforme
Trachelomonas cylindrica
v. *decollata*
Trachelomonas intermedia
Trachelomonas schauinslandii
Trachelomonas verrucosa
Trachelomonas volvocina
Trachelomonas volvocina
v. *punctata*
Treubaria setigerum
Treubaria triappendiculata
Ulothrix

APPENDIX B. SUMMARY OF PHYTOPLANKTON DATA

This appendix was generated by computer. Because it was only possible to use upper case letters in the printout, all scientific names are printed in upper case and are not italicized.

The alphabetic phytoplankton lists include taxa without species names (e.g., EUNOTIA, EUNOTIA #1, FLAGELLATE, FLAGELLATES, MICROCYSTIS INCERTA ?, CHLOROPHYTAN COCCOID CELLED COLONY). When species determinations were not possible, symbols or descriptive phrases were used to separate taxa for enumeration purposes. Each name on a list, however, represents a unique species different from any other name on the same list, unless otherwise noted, for counting purposes.

Numbers were used to separate unidentified species of the same genus. A generic name listed alone is also a unique species. A question mark (?) is placed immediately after the portion of a name which was assigned with uncertainty. Numbered, questioned, or otherwise designated taxa were established on a lake-by-lake basis; therefore NAVICULA #2 from lake A cannot be compared to NAVICULA #2 from lake B. Pluralized categories (e.g., FLAGELLATES, CENTRIC DIATOMS, SPP.) were used for counting purposes when taxa could not be properly differentiated on the counting chamber.

LAKE NAME: BIG LAKE
STORET NUMBER: 0401

NYGAARD TROPHIC STATE INDICES

DATE	06 19 75	10 06 75
MYXOPHYCEAN	01/0 E	4.00 E
CHLOROPHYCEAN	03/0 E	2.00 E
EUGLENOPHYTE	0.50 E	0/06 ?
DIATOM	0/02 ?	0.33 E
COMPOUND	06/0 E	7.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 19 75	10 06 75
GENUS	00	02
SPECIES	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 19 75	10 06 75
AVERAGE DIVERSITY	H	2.00	2.29
NUMBER OF TAXA	S	12.00	14.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00
MAXIMUM DIVERSITY	MAXH	3.58	3.81
MINIMUM DIVERSITY	MINH	0.53	0.15
TOTAL DIVERSITY	D	368.00	2306.03
TOTAL NUMBER OF INDIVIDUALS/ML	N	184.00	1007.00
EVENNESS COMPONENT	J	0.56	0.60
RELATIVE EVENNESS	RJ	0.49	0.59
MEAN NUMBER OF INDIVIDUALS/TAXA	L	15.33	71.93
NUMBER/ML OF MOST ABUNDANT TAXON	K	92.00	480.00

LAKE NAME: BIG LAKE
STORET NUMBER: 0401

CONTINUED

TAXA	FORM	06 19 75 IS	06 19 75 %C	06 19 75 ALGAL UNITS PER ML	10 06 75 IS	10 06 75 %C	10 06 75 ALGAL UNITS PER ML
ANABAENA	FIL				1	6.9	69
APHANOTHECE	COL				11	47.7	480
ASTERIONELLA FORMOSA	CEL			X	14	6.9	69
CHROOMONAS ?	CEL				13	13.6	137
COCCONEIS	CEL						X
COELOSPHAERIUM KAEGELIANUM	COL				7	6.9	69
CRIPTOMONAS EROSA	CEL	11	50.0	92	1	4.6	46
CRYPTOMONAS MARSSONII	CEL			X			
CRYPTOMONAS REFLEXA	CEL			X			
CYST	CEL	13	12.5	23			X
ELAKATOTHRIX GELATINOSA	COL			X			
EUGLENA	CEL	13	12.5	23			
FRAGILARIA	CEL			X			
FRAGILARIA CROTONENSIS	CEL						X
MELOSIRA	CEL				13	13.6	137
OOCYSTIS	CEL						X
OSCILLATORIA	FIL			X			X
SCHROEDERIA SETIGERA	CEL	13	12.5	23			X
SPHAEROCYSTIS SCHROETERI	CEL			X			
STAURASTRUM	CEL						X
TRACHELOMONAS VOLVOCINA	CEL	14	12.5	23			
TOTAL				184			1007

LAKE NAME: FOOLS HOLLOW
STORET NUMBER: 0402

NYGAARD TROPHIC STATE INDICES

DATE	03 04 75	06 19 75	10 06 75
MYXOPHYCEAN	0/01 O	2.00 E	0.67 E
CHLOROPHYCEAN	10.0 E	20.0 E	2.33 E
EUGLENOPHYTE	0/10 ?	0.05 ?	0.11 ?
DIATOM	0.50 E	0.29 ?	0.60 E
COMPOUND	13.0 E	27.0 E	4.00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	03 04 75	06 19 75	10 06 75
GENUS	06	05	03
SPECIES	03	04	03

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		03 04 75	06 19 75	10 06 75
AVERAGE DIVERSITY	H	2.92	2.79	1.00
NUMBER OF TAXA	S	25.00	47.00	27.00
NUMBER OF SAMPLES COMPOSITED	N	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.64	5.55	4.75
MINIMUM DIVERSITY	MINH	0.06	0.20	0.04
TOTAL DIVERSITY	D	17826.60	8512.29	8870.00
TOTAL NUMBER OF INDIVIDUALS/ML	N	6105.00	3051.00	8870.00
EVENNESS COMPONENT	J	0.63	0.50	0.21
RELATIVE EVENNESS	RJ	0.63	0.49	0.21
MEAN NUMBER OF INDIVIDUALS/TAXA	L	244.20	64.91	328.52
NUMBER/ML OF MOST ABUNDANT TAXON	K	2587.00	1681.00	7673.00

LAKE NAME: FOOLS HOLLOW
STORET NUMBER: 0402

CONTINUED

TAXA	FORM	03 04 75			06 19 75			10 06 75		
		IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML
ANABAENA	FIL					0.6	19		0.9	76
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL		1.0	60			X	1	1.3	116
APHANIZOMENON FLOS-AQUAE	FIL							1	3.5	310
ASTERIONELLA FORMOSA	CEL		3.9	241		0.6	19		0.4	39
CERATIUM HIRUNDINELLA	CEL									X
CHLOROPHYTAN COCCOID CELL	CEL					0.6	19			
CHROOMONAS ?	CEL	1	42.4	2587					1.3	116
CLOSTERIUM	CEL									X
COCCONEIS	CEL			X						
COCCONEIS PLACENTULA	CEL						X			X
COELASTRUM MICROPORUM	COL				1	6.3	193			
COELASTRUM RETICULATUM	COL					0.6	19			
COSMARIUM	CEL					1.3	39			
CRUCIGENIA TETRAPEDIA	COL			X						
CRYPTOMONAS EROSA	CEL	1	11.9	722		2.5	77	1	1.3	116
CRYPTOMONAS MARSSONII	CEL		5.4	331		2.5	77			
CYCLOTELLA	CEL	1	8.4	511			X			
CYMBELLA	CEL			X						
CYMBELLA MEXICANA	CEL									
CYMBELLA MINUTA	CEL						X			X
DIPLOPSALIS ACUTA	CEL					1.9	58			X
EPITHEMIA SOREX	CEL									X
FLAGELLATE	CEL		6.4	391			X			X
FRAGILARIA	CEL									
FRAGILARIA CROTONENSIS	CEL		1.5	90			X			
GOMPHONEMA TRUNCATUM V. CAPITATUM	CEL			X			X			
GYROSIGMA	CEL						X			
LAGERHEIMIA CILIATA	CEL		0.5	30	1	3.2	97			
LAGERHEIMIA QUADRISETA	CEL					0.6	19			
MALLOMONAS	CEL								0.9	76
MALLOMONAS ACAROIDES	CEL		2.0	120		0.6	19			
MELOSIRA	CEL						X			
MELOSIRA DISTANS	CEL	1	6.9	421	11	58.1	1681	11	96.5	7673
NOUGEOTIA	FIL									X
NAVICULA	CEL					0.6	19			
NEPHROCYTIUM AGARDHIANUM	CEL						X			
NITZSCHIA	CEL						X			
OOCYSTIS	CEL		2.0	120		6.3	193			X
OOCYSTIS KREMOSPHAERIA	CEL									X
OSCILLATORIA TENUIS	FIL					0.6	19			
PEDIASTRUM BORYANUM	COL			X		1.3	39			
PEDIASTRUM DUPLEX V. CLATHRATUM	COL						X			X
PEDIASTRUM SIMPLEX V. DUODENARIUM	COL						X			X
PEDIASTRUM TETRAS	COL			X						
PEDIASTRUM TETRAS V. TETRAODON	COL						X			X
PERIDINIUM	CEL									X
PERIDINIUM WILLEI	CEL						X			
SCENEDESMUS BIJUGA	COL					3.2	97			
SCENEDESMUS OVALTERNUS	COL						X			
SCENEDESMUS QUADRICAUDA	COL			X	1	4.4	135			
SCHROEDERIA SETIGERA	CEL			X			X			
SPHAEROCYSTIS SCHROETERI	COL								0.4	39
STAURASTRUM	CEL			X						
STAURASTRUM PACHYRHYNCHUM	CEL									X
STAURASTRUM TETRACERUM	CEL								0.4	39
STEPHANODISCUS	CEL			X			X		0.9	76
SYNEDRA	CEL	1	4.4	301			X			
SYNEDRA RUMPENS	CEL						X			
SYNEDRA ULNA	CEL						X			
TETRAEDRON CONSTRICTUM	CEL						X			
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL		0.5	30		1.9	58			
TETRAEDRON PENTAEDRICUM	CEL					0.6	19			
TETRASTRUM GLABRUM	COL		2.5	150		1.3	39			
TETRASTRUM STAUROGENIAFORME	COL						X			
TRACHELOMONAS INTERMEDIA	CEL				1	3.2	97	1	3.2	194
TOTAL				6105			3051			8870

LAKE NAME: LAKE HAVASU
STORET NUMBER: 0403

NYGAARD TROPHIC STATE INDICES

DATE	02 27 75	06 13 75	11 19 75
MYXOPHYCEAN	1,00 E	0/01 Q	05/0 E
CHLOROPHYCEAN	4,00 E	4,00 E	09/0 E
EUGLENOPHYTE	0/05 ?	2,00 E	0/14 ?
DIATOM	1,00 E	1,00 E	0,12 ?
COMPOUND	9,00 E	14,0 E	15/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	02 27 75	06 13 75	11 19 75
GENUS	08	06	05
SPECIES	02	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		02 27 75	06 13 75	11 19 75
AVERAGE DIVERSITY	H	2,09	2,45	2,84
NUMBER OF TAXA	S	18,00	23,00	28,00
NUMBER OF SAMPLES COMPOSITED	N	11,00	11,00	11,00
MAXIMUM DIVERSITY	MAXH	4,17	4,52	4,81
MINIMUM DIVERSITY	MINH	0,20	0,22	0,19
TOTAL DIVERSITY	D	2069,10	2834,65	4930,24
TOTAL NUMBER OF INDIVIDUALS/ML	N	990,00	1157,00	1736,00
EVENNESS COMPONENT	J	0,50	0,54	0,59
RELATIVE EVENNESS	RJ	0,48	0,52	0,58
MEAN NUMBER OF INDIVIDUALS/TAXA	L	55,00	50,30	62,00
NUMBER/ML OF MOST ABUNDANT TAXON	K	495,00	514,00	624,00

LAKE NAME: LAKE HAVASU
STORET NUMBER: 0403

CONTINUED

TAXA	FORM	02 27 75			06 13 75			11 19 75		
		BV	%C	ALGAL UNITS PER ML	BV	%C	ALGAL UNITS PER ML	BV	%C	ALGAL UNITS PER ML
ANKISTRODESMUS FALCATUS	CEL								2,0	35
APHANIZOMENON FLOS-AQUAE	FIL								2,0	35
ASTERIONELLA FORMOSA	CEL									X
CERATIUM HIRUNDINELLA	CEL						X			
CHROOMONAS ?	CEL	15	10,2	180		4,4	51	14	0,0	139
CLOSTERIUM	COL			X						
COCCONEIS	CEL									X
COELASTRUM MICROPORUM	COL									X
COSMARIUM	CEL						X			
CRYPTOMONAS EROSA	CEL	12	9,1	90	14	8,9	103	11	21,9	381
CYCLOTELLA	CEL				13	17,8	206	13	10,0	173
CYCLOTELLA MENEGHINIANA	CEL	14	9,1	90						
CYMBELLA CUSPIDATA	CEL									X
CYMBELLA MEXICANA	CEL			X						
CYMBELLA MINUTA	CEL			X						X
CYST	CEL			X						
DIATOMA VULGARE	CEL									X
DIATOMA VULGARE V. BREVE	CEL			X						
DICTYOSPHAERIUM PULCHELLUM	COL									X
DINOBRYON DIVERGENS	CEL						X			
EUGLENA	CEL						X			
EUGLENA ACUS	CEL					2,2	26			
EUGLENA TRIPTERIS	CEL					2,2	26			
FLAGELLATE	CEL						X			
FRAGILARIA CROTONENSIS	CEL				11	44,4	514			
GLENODINIUM	CEL			X						
GLENODINIUM OCULATUM	CEL						X		2,0	35
GOMPHONEMA INTRICATUM	CEL									X
LAGERHEIMIA CILIATA	CEL						X			
LEPOCINCLIS PLATYFAIRIANA	CEL						X			
LYNGBYA	FIL							15	0,0	139
MALLOMONAS PSEUDOCORONATA ?	CEL									X
NAEGELIA GREVILLEI	CEL									X
MELOSIRA DISTANS	CEL			X						
MELOSIRA VARIANS	CEL			X						
NITZSCHIA	CEL						X			
OOCYSTIS	COL			X	15	6,7	77			
OSCILLATORIA LIMNETICA	FIL								2,0	35
OSCILLATORIA PROLIFICA	FIL	11	50,0	495						
PERIDINIUM INCONSPICUUM	CEL									X
PHACUS ACUMINATUS V. DREZEPOLSKII	CEL						X			
PHACUS PSEUDONORDSTEDTII	CEL						X			
RAPHIDIOPSIS CURVATA	FIL							13	38,9	634
SCENEDESMUS ABUNDANS	COL			X		2,2	26		2,0	35
SCENEDESMUS BIJUGA	COL								2,0	35
SCENEDESMUS DIMORPHUS	COL								2,0	35
SCENEDESMUS OVALTERNUS	COL									X
SCENEDESMUS QUADRICAUDA	COL		4,5	45						
SKELETONEMA POTAMOS	CEL						X			
SPHAEROCYSTIS SCHROETERI	COL						X			
SPIRULINA MAJOR	FIL									X
STEPHANODISCUS	CEL			X						
SYNEDRA	CEL	13	9,1	90						X
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL			X					2,0	35
TETRASTRUM STAUROGENIAEFORME	COL									X
TRACHELOMONAS	CEL						X			
TRACHELOMONAS VERRUCOSA	CEL				13	11,1	128			
TOTAL				990			1157			1736

LAKE NAME: LUNA LAKE
STORET NUMBER: 0404

NYGAARD TROPHIC STATE INDICES

DATE	04 30 75	06 18 75	10 06 75
MYXOPHYCEAN	0/0 D	03/0 E	1.00 E
CHLOROPHYCEAN	04/0 E	01/0 E	0.50 ?
EUGLENOPHYTE	0.50 E	0/04 ?	0/03 ?
DIATON	0.40 E	0.50 E	0.67 E
COMPOUND	08/0 E	06/0 E	3.50 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 30 75	06 18 75	10 06 75
GENUS	05	05	00
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 30 75	06 18 75	10 06 75
AVERAGE DIVERSITY	H	1.52	2.13	1.60
NUMBER OF TAXA	S	17.00	11.00	17.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	4.09	3.46	4.09
MINIMUM DIVERSITY	MINH	0.04	0.10	1.25
TOTAL DIVERSITY	D	7867.28	2347.26	163.20
TOTAL NUMBER OF INDIVIDUALS/ML	N	5189.00	1102.00	102.00
EVENNESS COMPONENT	J	0.37	0.62	0.39
RELATIVE EVENNESS	RJ	0.37	0.61	0.13
MEAN NUMBER OF INDIVIDUALS/TAXA	L	305.24	100.18	6.00
NUMBER/ML OF MOST ABUNDANT TAXON	K	2990.00	420.00	34.00

LAKE NAME: LUNA LAKE
STORET NUMBER: 0404

CONTINUED

TAXA	FORM	04 30 75 %	04 30 75 ALGAL UNITS PER ML	06 18 75 %	06 18 75 ALGAL UNITS PER ML	10 08 75 %	10 08 75 ALGAL UNITS PER ML
ANABAENA	FIL			13	23.81	262	
ANKISTRODESMUS FALCATUS	CEL				X		
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL	19	1.71	88			
APHANIZOMENON FLOS-AQUAE	FIL			12	9.51	105	X
BINUCLEARIA TATRANA	FIL		X				
CHROOMONAS ?	CEL	12	31.41	1437			
CLOSTERIUM	CEL						X
COCCONEIS PLACENTULA	CEL				X		X
CRYPTOMONAS EROSA	CEL	11	57.41	2990			
CRYPTOMONAS MARSSONII	CEL		X	14	9.51	105	X
CRYPTOMONAS OVATA	CEL					11	33.31 34
CYCLOTELLA	CEL	13	5.01	308			X
DIATOMA VULGARE	CEL						X
FRAGILARIA	CEL			15	19.11	210	X
FRAGILARIA CROTONENSIS	CEL				X		
MELOSIRA	CEL						X
MELOSIRA DISTANS	CEL						X
MELOSIRA ITALICA	CEL				X		
MERIDION CIRCULARE V. CONSTRICTUM	CEL		X				
NAVICULA	CEL		X		X		
NITZSCHIA	CEL	0.81	44			13	33.31 34
OOCYSTIS	CEL						X
OSCILLATORIA LIMNETICA	FIL			11	38.11	420	12 33.31 34
PEDIASTRUM BORYANUM	COL		X				
PHACUS ACUMINATUS V. DREZEPOLSKII	CEL		X				
SCENEDESMUS BIJUGA	COL		X				
SCENEDESMUS DIMORPHUS	COL		X				
STAURASTRUM	CEL						X
STEPHANODISCUS	CEL		X				X
STEPHANODISCUS NIAGARAE	CEL				X		
SURIRELLA ANGUSTATA	CEL						X
SYNEDRA	CEL	14	2.51	132			
SYNEDRA ULNA	CEL		X				X
TRACHELOMONAS INTERMEDIA	CEL		X				
TOTAL			5189		1103		102

NYGAARD TROPHIC STATE INDICES

DATE	04 30 75	06 19 75	10 06 75
MYXOPHYCEAN	01/0 E	01/0 E	05/0 E
CHLOROPHYCEAN	01/0 E	0/0 O	01/0 E
EUGLENOPHYTE	1.50 E	0/01 ?	0/06 ?
DIATON	0.17 ?	0.20 ?	0.50 E
COMPOUND	06/0 E	02/0 E	07/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 30 75	06 19 75	10 06 75
GENUS	00	00	01
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 30 75	06 19 75	10 06 75
AVERAGE DIVERSITY	H	1.93	0.59	2.13
NUMBER OF TAXA	S	13.00	9.00	11.00
NUMBER OF SAMPLES COMPOSITED	N	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	3.70	3.17	3.46
MINIMUM DIVERSITY	MINH	0.67	0.28	0.17
TOTAL DIVERSITY	D	299.15	161.07	1371.72
TOTAL NUMBER OF INDIVIDUALS/ML	N	155.00	273.00	644.00
EVENNESS COMPONENT	J	0.52	0.19	0.62
RELATIVE EVENNESS	RJ	0.42	0.11	0.60
MEAN NUMBER OF INDIVIDUALS/TAXA	L	11.92	30.33	58.55
NUMBER/ML OF MOST ABUNDANT TAXON	K	62.00	234.00	276.00

LAKE NAME: LYMAN LAKE
STORET NUMBER: 0405

CONTINUED

TAXA	FORM	04 30 75 IB	04 30 75 %C	04 30 75 ALGAL UNITS PER ML	06 19 75 IB	06 19 75 %C	06 19 75 ALGAL UNITS PER ML	10 06 75 IB	10 06 75 %C	10 06 75 ALGAL UNITS PER ML
ACHNANTHES	CEL						X			
ANABAENA	FIL			X			X	15	7.1	46
ANKISTRODESMUS FALCATUS	CEL			X						
APHANIZOMENON FLOS-AQUAE	FIL									X
CHROOCOCCUS DISPERSUS	COL							11	42.9	276
CHROOMONAS ?	CEL				11	86.7	234	13	28.6	184
COCCONEIS PLACENTULA	CEL	12	20.0	31			X			
CRYPTOMONAS	CEL						X			
CRYPTOMONAS EROSA	CEL	11	40.0	62				14	7.1	46
CYLINDROTHECA GRACILIS	CEL			X						
CYMBELLA MINUTA	CEL						X			
DIATOMA VULGARE	CEL									X
EUGLENA	CEL			X						
GOMPHONEMA VENTRICOSUM	CEL						X			
GYROSIGMA	CEL			X						
MICROCYSTIS AERUGINOSA	COL									X
NAVICULA	CEL						X			
NITZSCHIA	CEL	13	20.0	31						
OOCYSTIS	COL								7.1	46
PHACUS PLEURONECTES	CEL	14	20.0	31						
PHORMIDIUM MUCICOLA	CEL									X
STEPHANODISCUS	CEL			X	12	14.3	39	13	7.1	46
SURIRELLA	CEL			X						
SURIRELLA OVATA	CEL			X						
SYNEDRA	CEL									X
TRACHELOMONAS SCHAUINSLANDII	CEL			X						
TOTAL				185			273			644

NYGAARD TROPHIC STATE INDICES

DATE	02 26 75	06 12 75	12 03 75
MYXOPHYCEAN	1.00 E	0/01 O	04/0 E
CHLOROPHYCEAN	2.00 E	4.00 E	09/0 E
EUGLENOPHYTE	0/03 ?	0/04 ?	0/13 ?
DIATOM	0.40 E	0.25 ?	0.29 ?
COMPOUND	5.00 E	5.00 E	15/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	02 26 75	06 12 75	12 03 75
GENUS	08	00	07
SPECIES	00	00	04

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		02 26 75	06 12 75	12 03 75
AVERAGE DIVERSITY	H	2.22	2.19	2.35
NUMBER OF TAXA	S	16.00	15.00	28.00
NUMBER OF SAMPLES COMPOSITED	M	8.00	8.00	8.00
MAXIMUM DIVERSITY	MAXH	4.00	3.91	4.81
MINIMUM DIVERSITY	MINH	0.07	0.16	0.28
TOTAL DIVERSITY	D	5732.04	2231.61	2664.90
TOTAL NUMBER OF INDIVIDUALS/ML	N	2582.00	1019.00	1134.00
EVENNESS COMPONENT	J	0.56	0.56	0.49
RELATIVE EVENNESS	RJ	0.55	0.55	0.46
MEAN NUMBER OF INDIVIDUALS/TAXA	L	161.38	67.93	40.50
NUMBER/ML OF MOST ABUNDANT TAXON	K	802.00	401.00	378.00

LAKE NAME: LAKE MOHAVE
STORET NUMBER: 0406

CONTINUED

TAXA	FORM	03 26 75			06 12 75			12 03 75		
		IS	%C	ALGAL UNITS PER ML	IS	%C	ALGAL UNITS PER ML	IS	%C	ALGAL UNITS PER ML
ANABAENOPSIS CIRCULARIS	FIL									X
ANKISTRODESMUS FALCATUS	CEL									X
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL			X					3.0	34
APHANIZOMENON FLOS-AQUAE	FIL									X
CERATIUM HIRUNDINELLA	CEL				1	3.5	36			
CHROOMONAS ?	CEL	1	7.0	698	1	9.4	401	1	3.3	378
COELASTRUM MICROPORUM	COL						X			X
COELASTRUM RETICULATUM	COL									X
COSMARIUM	CEL						X			
CRYPTOMONAS EROSA	CEL	1	3.5	349	1	3.5	36		3.0	34
CYCLOTELLA	CEL	1	1.1	902				1	8.2	206
CYCLOTELLA MENEGHINIANA	CEL						X			
CYMATOPLEURA	CEL									X
CYMBELLA MINUTA	CEL			X						X
CYST	CEL			X	1	1.4	318			
DIATOMA VULGARE	CEL			X			X			X
DINOBRION DIVERGENS	CEL						X			
DIPLOPSALIS ACUTA	CEL									X
FLAGELLATE	CEL			X						
FRAGILARIA	CEL			X						
FRAGILARIA CROTONENSIS	CEL				1	4.5	146			X
GLENODINIUM GYMNODINIUM V. BISCUTELLIFORME	CEL			X						X
GLENODINIUM OCULATUM	CEL									X
GYROSIGMA	CEL									X
MELOSIRA VARIANS	CEL			X						
NAVICULA TRIPUNCTATA	CEL			X			X			
OOCYSTIS	CEL			X	2	7.9	102			X
OOCYSTIS EREMOSPHAERIA	CEL	?					X			
OSCILLATORIA	FIL	1	8.2	419						
OSCILLATORIA LIMNETICA	FIL									X
PERIDINIUM INCONSPICUUM	CEL									X
RAPHIDIOPSIS CURVATA	FIL							1	7.3	310
SCENEDESMUS ACUTUS	COL									X
SCENEDESMUS BIJUGA	COL									X
SCENEDESMUS INTERMEDIUS	COL									X
SCENEDESMUS QUADRICAUDA	COL							1	9.1	103
SPHAEROCYSTIS SCHROETERI	COL						X			
STAURASTRUM	CEL			X						
SYNEDRA	CEL	1	2.3	314			X	1	6.1	69
SYNEDRA ULNA	CEL									X
TOTAL				3502			1019			1134

LAKE NAME: LAKE PLEASANT
STORET NUMBER: 0407

NYGAARD TROPHIC STATE INDICES

DATE	03 05 75	06 17 75	11 15 75
MYXOPHYCEAN	0/0 O	06/0 E	05/0 E
CHLOROPHYCEAN	03/0 E	11/0 E	15/0 E
EUGLENOPHYTE	0,33 E	0,24 E	0,05 ?
DIATON	1,00 E	2,00 E	0,50 E
COMPOUND	05/0 E	23/0 E	22/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	03 05 75	06 17 75	11 15 75
GENUS	03	07	11
SPECIES	03	03	07

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		03 05 75	06 17 75	11 15 75
AVERAGE DIVERSITY	H	2,68	3,43	3,70
NUMBER OF TAXA	S	12,00	31,00	29,00
NUMBER OF SAMPLES COMPOSITED	M	7,00	3,00	3,00
MAXIMUM DIVERSITY	MAXH	3,58	4,95	4,86
MINIMUM DIVERSITY	MINH	0,09	0,10	0,05
TOTAL DIVERSITY	D	3682,32	14244,79	27986,80
TOTAL NUMBER OF INDIVIDUALS/ML	N	1374,00	4153,00	7564,00
EVENNESS COMPONENT	J	0,75	0,69	0,76
RELATIVE EVENNESS	RJ	0,75	0,69	0,76
MEAN NUMBER OF INDIVIDUALS/TAXA	L	114,50	133,97	260,83
NUMBER/ML OF MOST ABUNDANT TAXON	K	491,00	804,00	1518,00

LAKE NAME: LAFF PLEASANT CONTINUED
STORET NUMBER: 0407

TAXA	FORM	03 05 75 IB	03 05 75 %C	03 05 75 ALGAL UNITS PER ML	06 17 75 IB	06 17 75 %C	06 17 75 ALGAL UNITS PER ML	11 19 75 IB	11 19 75 %C	11 19 75 ALGAL UNITS PER ML
ANABAENOPSIS CIRCULARIS	FIL						X			
ANABAENOPSIS RACIBORSKII	FIL					2.6	109			
ANKISTRODESMUS FALCATUS	CEL	14	21.5	295			X		1.0	77
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL					4.2	174			
CENTRIC DIATOM	CEL					19.4	804			
CERATIUM HIRUNDINELLA F. BRACHYCERAS	CEL			X				11	1.0	77
CHLAMYDOMONAS	CEL								0.3	26
CHROOCOCCUS PRESCOTTII ?	COL					2.1	87			
CHRODOMONAS ? ACUTA	CEL	19	10.7	147			X	14	10.9	823
COELASTRUM SPHAERICUM	COL					0.5	22			
CRUCIGENIA TETRAPEDIA	CEL		3.6	49		6.3	261		5.0	437
CRYPTOMONAS	CEL	13	7.1	98	19	2.1	87		3.7	303
DACTYLOCOCCOPSIS	CEL					13.1	544	13	20.1	1518
DICTYOSPHAERIUM PULCHELLUM	COL						X			
DINOBRYON SOCIALE V. AMERICANUM	CEL				14	3.7	152			
EUGLENA	CEL						X			
GLENODINIUM EDAX	CEL					0.5	22			
GYMNODINIUM ORDINATUM	CEL			X					0.7	51
KIRCHNERIELLA	CEL								3.4	257
LYNGBYA CONTORTA	FIL				12	5.2	217		0.3	26
MELOSIRA DISTANS	CEL		7.1	98	13	13.6	565	15	11.6	875
MERISMOPEDIA TENUISSIMA	COL									X
MESOTIGNA VIRIDIS	CEL					0.5	22			
MICROCYSTIS INCERTA	COL								1.4	103
NITZSCHIA #1	CEL								8.0	669
NITZSCHIA #2	CEL				11	17.0	739			
OSCILLATORIA	FIL									X
OSCILLATORIA PUBESCENS	FIL						X			
PEDIASTRUM TETRAS V. TETRADON	COL					0.5	22			
PENNATE DIATOM	CEL		7.1	98						
PERIDINIUM #1	CEL	11	35.7	491						
PERIDINIUM #2	CEL	13	3.6	49						
PERIDINIUM INCONSPICUUM	CEL					0.5	22			
PERIDINIUM QUADRIDENS	CEL						X			
PHACUS #1	CEL			X			X			
PHACUS #2	CEL									X
PHACUS MEGALOPSIS	CEL						X			
SCENEDESMUS ACUMINATUS	COL					0.5	22			
SCENEDESMUS BICAUDATUS	COL								0.3	26
SCENEDESMUS BIJUGA	COL								8.0	669
SCENEDESMUS DIMORPHUS	COL								2.0	184
SCENEDESMUS QUADRICAUDA	COL								0.7	51
SCHROEDERIA JUDAYI	CEL								1.7	139
SCHROEDERIA SETIGERA	CEL								3.7	306
STAURONEIS	CEL									X
TETRAEDRON CAUDATUM	CEL									X
TETRAEDRON CAUDATUM V. LONGISPINUM	CEL					1.0	43		1.4	103
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL					5.0	239		1.0	77
TETRAEDRON REGULARE	CEL								0.3	26
TETRASTRUM STAUROGENIAEFORME	COL		3.6	49			X	13	11.6	876
TRACHELOMONAS	CEL						X			
TREUBARIA SETIGERUM	CEL								0.5	26
TREUBARIA TRIAPPENDICULATA	CEL						X			
TOTAL				1374			4183			7564

NYGAARD TROPHIC STATE INDICES

DATE	04 16 75	08 14 75	12 01 75
MYXOPHYCEAN	0/0 O	04/0 E	0/0 O
CHLOROPHYCEAN	01/0 E	10/0 E	04/0 E
EUGLENOPHYTE	0/01 ?	0/14 ?	0/04 ?
DIATOM	0,50 E	1,00 E	1,00 E
COMPOUND	02/0 E	17/0 E	05/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	04 16 75	08 14 75	12 01 75
GENUS	00	03	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		04 16 75	08 14 75	12 01 75
AVERAGE DIVERSITY	H	1,66	2,66	1,45
NUMBER OF TAXA	S	7,00	28,00	9,00
NUMBER OF SAMPLES COMPOSITED	M	19,00	18,00	21,00
MAXIMUM DIVERSITY	MAXH	2,81	4,81	3,17
MINIMUM DIVERSITY	MINH	0,06	0,17	0,10
TOTAL DIVERSITY	D	2036,82	5184,34	1300,65
TOTAL NUMBER OF INDIVIDUALS/ML	N	1227,00	1949,00	897,00
EVENNESS COMPONENT	J	0,59	0,55	0,46
RELATIVE EVENNESS	RJ	0,59	0,54	0,44
MEAN NUMBER OF INDIVIDUALS/TAXA	L	175,29	69,61	99,67
NUMBER/ML OF MOST ARUNDANT TAXON	K	513,00	816,00	486,00

LAKE NAME: LAKE POWELL
STORET NUMBER: 0408

CONTINUED

TAXA	FORM	04 16 75			09 14 75			12 01 75		
		IS	%C	ALGAL UNITS PER ML	IS	%C	ALGAL UNITS PER ML	IS	%C	ALGAL UNITS PER ML
ACTINASTRUM	COL						X			
ASTERIONELLA FORMOSA	CEL			X						
BOTRYOCOCCUS BRAUNII	COL			X						
CENTRIC DIATOM	CEL			X	1	9.5	186			
CHROOMONAS ? ACUTA	CEL	13	41.9	913	13	19.0	371	12	54.2	486
COELASTRUM SPHAERICUM	COL						X			
CRYPTOMONAS	CEL	12	20.9	257	15	4.8	93	13	3.9	36
CRYPTOMONAS MARSSONII	CEL						X			
DACTYLOCOCCOPSIS	CEL				1	2.9	56			
DICTYOSPHAERIUM PULCHELLUM	COL						X			
DINOBRYON SOCIALE V. AMERICANUM	CEL				1	1.0	19			
ELAKATOTHRIX VIRIDIS	CEL						X			
FRAGILARIA CROTONENSIS	CEL	11	34.9	428	11	41.9	816	11	37.1	333
GLENODINIUM	CEL						X			
GLENODINIUM EDAX	CEL	14	2.4	29			X			
KIRCHNERIELLA	CEL									X
LAGERHEIMIA CITRIFORMIS	CEL						X			X
NALLOMONAS	CEL				1	1.0	19			X
MERISMOPEDIA MINIMA	COL				1	1.0	19			
MERISMOPEDIA TENUISSIMA	COL						X			
NAVICULA	CEL				12	7.6	148			
OOCYSTIS	CEL						X			
OSCILLATORIA LIMNETICA	FIL						X			
PERIDINIUM QUADRIDENS	CEL				14	1.0	19			
SCENEDESMUS ACUMINATUS	COL						X			
SCENEDESMUS QUADRICAUDA	COL				1	1.0	19	13	3.9	36
SKELETONEMA POTAMOS	CEL				1	7.6	148			
SPHAEROCYSTIS SCHROETERI	COL						X			
STEPHANODISCUS	CEL						X			X
SYNEDRA	CEL						X			
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL				1	1.9	37	14	3.9	36
TOTAL				1237			1949			897

NYGAARD TROPHIC STATE INDICES

DATE	03 04 75	06 19 75	10 06 75
MYXOPHYCEAN	0,50 E	0,50 E	1,00 E
CHLOROPHYCEAN	1,83 E	1,17 E	0,50 ?
EUGLENOPHYTE	0,07 ?	0,30 E	0,67 E
DIATOM	0,10 ?	0/12 ?	0/10 ?
COMPOUND	2,67 E	2,17 E	2,50 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	03 04 75	06 19 75	10 06 75
GENUS	10	02	00
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		03 04 75	06 19 75	10 06 75
AVERAGE DIVERSITY	H	0,52	0,72	1,06
NUMBER OF TAXA	S	39,00	36,00	20,00
NUMBER OF SAMPLES COMPOSITED	M	2,00	2,00	2,00
MAXIMUM DIVERSITY	MAXH	5,29	5,17	4,32
MINIMUM DIVERSITY	MINH	0,01	0,03	0,06
TOTAL DIVERSITY	D	28951,00	14212,80	4852,68
TOTAL NUMBER OF INDIVIDUALS/ML	N	55675,00	19740,00	4578,00
EVENNESS COMPONENT	J	0,10	0,14	0,28
RELATIVE EVENNESS	RJ	0,10	0,14	0,24
MEAN NUMBER OF INDIVIDUALS/TAXA	L	1427,56	548,33	228,90
NUMBER/ML OF MOST ABUNDANT TAXON	K	52327,00	17976,00	3821,00

LAKE NAME: RAINBOW LAKE
STORET NUMBER: 0409

CONTINUED

TAXA	FORM	03 04 75			06 19 75			10 06 75		
		IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML
ANKISTRODESMUS FALCATUS	CEL			X						
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL		0.01	419		0.21	44			
APHANOCAPSA	COL		0.01	26						
ARTHROSPIRA JENNERI	FIL						X			
ASTERIONELLA FORMOSA	CEL						X			
BUTRYOCOCCUS BRAUNII	COL			X						
CERATIUM HIRUNDINELLA	CEL						X			
CHROOMONAS ? ACUTA	CEL		1.31	706		1.31	265		6.61	303
CLOSTERIUM #1	CEL						X			
CLOSTERIUM #2	CEL						X			
CLOSTERIUM #3	CEL			X						
CLOSTERIUM #4	CEL			X						
COCCONEIS PLACENTULA	CEL			X	14	0.7	132		0.7	30
COELASTRUM SPHAERICUM	COL					0.4	89			
COELOSPHAERIUM	COL			X						
COSMARIUM #1	CEL		0.2	105			X			X
COSMARIUM #2	CEL						X			
COSMARIUM #3	CEL			X						
CRUCIGENIA RECTANGULARIS	COL						X			
CRYPTOMONAS	CEL	15	0.3	193	18	0.4	89			
CRYPTOMONAS EROSA	CEL							12	2.0	91
CRYPTOMONAS MARSSONII	CEL	14	0.9	497		1.3	265	14	3.3	152
CYCLOTELLA	CEL	11	94.0	52327						
CYMATOPLEURA SOLEA	CEL			X						
CYMBELLA	CEL			X						
DICTYOSPHAERIUM PULCHELLUM	COL			X						
DINOBRYON SERTULARIA	CEL			X						
EPITHEMIA #1	CEL			X		0.4	89	18	0.7	30
EPITHEMIA SOREX	CEL		0.2	131	12	2.7	530	13	2.0	91
EUGLENA	CEL								0.7	30
FRAGILARIA CAPUCINA V. MESOLEPTA	CEL	13	0.6	340	11	91.1	17976	11	83.8	3821
FRAGILARIA CROTONENSIS	CEL			X						
GLENODINIUM EDAX	CEL		0.1	78						
GOMPHONEMA	CEL			X						
GOMPHONEMA #1	CEL						X			X
GOMPHONEMA #2	CEL						X			
GOMPHONEMA TRUNCATUM	CEL					0.2	44			X
LYNGBYA	FIL						X			
MERISMOPEDIA MINIMA	COL								0.7	30
NAVICULA	CEL									X
NAVICULA CUSPIDATA	CEL						X			
NEPHROCYTIUM	COL			X			X			
NITZSCHIA	CEL		0.7	366						X
OEDOGONIUM	FIL			X						
OOCYSTIS	CEL	12	0.8	419			X			
OSCILLATORIA LIMNETICA	FIL									X
OSCILLATORIA RUBESCENS	FIL			X						
OSCILLATORIA SPLENDIDA ?	FIL						X			
PEDIASTRUM ANGULOSUM	COL			X						
PEDIASTRUM BORYANUM	COL			X		0.2	44			X
PERIDINIUM WILLEI	CEL			X						
PHACUS TORTUS	CEL						X			
PINNULARIA	CEL									X
RHOPALODIA GIBBA	CEL						X			
SCENEDESMUS BIJUGA	COL		0.1	52						
SCENEDESMUS QUADRICAUDA	COL			X						
STAURASTRUM #1	CEL			X			X			X
STAURASTRUM #3	CEL			X			X			
SYNEDRA	CEL									X
SYNEDRA ACUS	CEL					0.2	44			
SYNEDRA ULNA	CEL			X	13	0.3	44			
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL		0.8	26		0.4	89			
TRACHELOMONAS VOLVOCINA	CEL			X			X			
TRACHELOMONAS VOLVOCINA V. PUNCTATA	CEL						X			X
ULOTHRIX	FIL						X			
TOTAL				55675			19740			4870

LAKE NAME: ROOSEVELT LAKE
STORET NUMBER: 0410

NYGAARD TROPHIC STATE INDICES

DATE	03 05 75	06 17 75	11 18 75
MYXOPHYCEAN	01/0 E	04/0 E	03/0 E
CHLOROPHYCEAN	05/0 E	09/0 E	06/0 E
EUGLENOPHYTE	0/05 ?	0.08 ?	0.11 ?
DIATON	0/0 ?	1.00 E	1.00 E
COMPOUND	06/0 E	16/0 E	12/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	03 05 75	06 17 75	11 18 75
GENUS	02	02	09
SPECIES	03	03	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		03 05 75	06 17 75	11 18 75
AVERAGE DIVERSITY	H	2.16	3.04	3.10
NUMBER OF TAXA	S	14.00	28.00	22.00
NUMBER OF SAMPLES COMPOSITED	M	5.00	5.00	5.00
MAXIMUM DIVERSITY	MAXH	3.81	4.81	4.46
MINIMUM DIVERSITY	MINH	0.06	0.21	0.12
TOTAL DIVERSITY	D	8687.28	4575.20	6661.90
TOTAL NUMBER OF INDIVIDUALS/ML	N	2633.00	1505.00	2149.00
EVENNESS COMPONENT	J	0.57	0.63	0.70
RELATIVE EVENNESS	RJ	0.56	0.62	0.69
MEAN NUMBER OF INDIVIDUALS/TAXA	L	188.07	53.75	97.68
NUMBER/ML OF MOST ABUNDANT TAXON	K	1343.00	488.00	639.00

LAKE NAME: ROOSEVELT LAKE CONTINUED
STORET NUMBER: 0410

TAXA	FORM	03 05 75			06 17 75			11 19 75		
		I8	%C	ALGAL UNITS PER ML	I8	%C	ALGAL UNITS PER ML	I8	%C	ALGAL UNITS PER ML
ANABAENOPSIS CIRCULARIS	FIL				121	7.0	117			X
ANKISTRODESMUS FALCATUS	CEL				131	19.0	195			
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL		3.1	84						
CARTERIA	CEL						X			
CENTRIC DIATOM	CEL					3.0	59			
CERATIUM HIRUNDINELLA F. BRACHYCERAS	CEL			X			X			
CHLAMYDOMONAS	CEL								3.6	77
CHLOROGONIUM	CEL						X			
CHROOMONAS ? ACUTA	CEL	13	51.0	1343	15	10.4	155	12	29.7	639
COELASTRUM SPHAERICUM	COL					1.3	20			
CRUCIGENIA ?	COL									X
CRUCIGENIA TETRAPEDIA	COL		1.0	27			X			
CRYPTOMONAS EROSA	CEL	13	13.3	332		1.3	20		1.2	26
CYCLOTELLA	CEL								3.6	77
DACTYLOCOCCOPSIS	CEL	14	21.4	564		5.2	78	14	11.9	256
DICTYOSPHAERIUM PULCHELLUM	COL						X			
DINOBRYON SOCIALE	CEL						X			
EPITHEMIA	CEL						X			
EUGLENA	CEL						X			
FRAGILARIA CROTONENSIS	CEL								4.7	102
GLENODINIUM #1	CEL	11	6.1	161						
GLENODINIUM #2	CEL						X			
GLENODINIUM EDAX	CEL	1	1.0	27		1.3	20			X
GYMNODINIUM	CEL									X
KIRCHNERIELLA	CEL							13	22.6	486
MALLOMONAS	CEL			X						
MELOSIRA GRANULATA V. ANGUSTISSIMA F. SPIRALIS	CEL						X			
MERISMOPEDIA MINIMA	COL					1.3	20		3.6	77
MESOTAENIUM VIRIDIS	CEL		1.0	27		1.3	20			
OOCYSTIS	CEL						X			
OSCILLATORIA LIMNETICA	FIL					2.6	39			
PANDORINA MORUM	COL									X
PEDIASTRUM TETRAS V. TETRAODON	COL						X			
PENNATE DIATOM	CEL				11	32.4	488			
PERIDINIUM #1	CEL									X
PERIDINIUM ELPATIEWSKY	CEL						X			
PERIDINIUM INCONSPICUUM	CEL							11	2.4	51
PTEROMONAS	CEL			X						
SCENEDESMUS BIJUGA	COL	1	1.0	27				13	4.7	102
SCENEDESMUS QUADRICAUDA	COL									X
SKELETONEMA POTAMOS	CEL								4.7	102
SYNEDRA ULNA	CEL									X
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL		2.1	56	14	15.8	234		3.6	77
TETRASTRUM STAUROGENIAEFORME	COL	1	1.0	27	1	2.6	39			
TRACHELOMONAS	CEL								2.4	51
TREUBARIA SETIGERUM	CEL						X		1.2	26
TOTAL				2633			1509			3149

LAKE NAME: SAN CARLOS RES,
STORET NUMBER: 0411

NYGAARD TROPHIC STATE INDICES

DATE	03 04 75	06 18 75	11 18 75
MYXOPHYCEAN	02/0 E	04/0 E	01/0 E
CHLOROPHYCEAN	06/0 E	07/0 E	10/0 E
EUGLENOPHYTE	0,50 E	0,36 E	0,45 E
DIATOM	1,00 E	1,00 E	01/0 E
COMPOUND	14/0 E	18/0 E	17/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	03 04 75	06 18 75	11 18 75
GENUS	12	21	09
SPECIES	06	03	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		03 04 75	06 18 75	11 18 75
AVERAGE DIVERSITY	H	2,91	2,91	0,83
NUMBER OF TAXA	S	22,00	30,00	26,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	4,00	3,00
MAXIMUM DIVERSITY	MAXH	4,46	4,91	4,70
MINIMUM DIVERSITY	MINH	0,05	0,07	0,05
TOTAL DIVERSITY	D	17081,70	18103,11	5853,99
TOTAL NUMBER OF INDIVIDUALS/ML	N	5870,00	6221,00	7053,00
EVENNESS COMPONENT	J	0,65	0,59	0,18
RELATIVE EVENNESS	RJ	0,65	0,59	0,17
MEAN NUMBER OF INDIVIDUALS/TAXA	L	266,82	207,37	271,27
NUMBER/ML OF MOST ABUNDANT TAXON	K	2045,00	2463,00	6312,00

LAKE NAME: SAN CARLOS RES.
STORET NUMBER: 0411

CONTINUED

TAXA	FORM	03 04 75			06 18 75			11 18 75		
		IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML
ANABAENOPSIS CIRCULARIS	FIL				131	3.8	238			
ANKISTRODESMUS FALCATUS	CEL	12	34.8	2045		1.3	79			X
ANKISTRODESMUS FALCATUS V. MIRABILIS	CEL					X				
CARTERIA	CEL				12	21.7	1351			X
CENTRIC DIATOM	CEL					6.8	424			
CERATIUM HIRUNDINELLA F. BRACHYCERAS	CEL				11	4.3	265			X
CHLAMYDOMONAS	CEL							15	0.8	59
CHLOROGONIUM	CEL							1	0.4	30
CHROOMONAS ? ACUTA	CEL		6.8	380				11	89.5	6313
COELASTRUM SPHAERICUM	COL		0.5	29						X
CRUCIGENIA TETRAPEDIA	COL					X				
CRYPTOMONAS	CEL									X
CRYPTOMONAS EROSA	CEL	11	23.9	1403		0.4	26			
CYCLOTELLA	CEL			X						
DACTYLOCOCCOPSIS	CEL		9.9	584		8.5	530	14	2.9	207
DINOBRYON SOCIALE V. AMERICANUM	CEL					0.4	26			
EPITHEMIA	CEL					X				
EUGLENA	CEL	15	3.0	175		1.7	106	13	1.3	89
FRAGILARIA	CEL					X				
FRAGILARIA CROTONENSIS	CEL		1.5	88						
GLENODINIUM #1	CEL					0.4	26			
GLENODINIUM #2	CEL					1.3	79			
GLENODINIUM EDAX	CEL									X
GYMNODINIUM ORDINATUM	CEL	13	3.0	175						
KIRCHNERIELLA	CEL		8.0	467					0.8	59
LAGERHEINIA	COL			X						
LEPOCINCLIS	CEL									
LYNGBYA	FIL			X		X				
MELOSIRA	CEL					39.6	2483			
MERISMOPEDIA	CEL					X				
MESOSTIGMA VIRIDIS	CEL		1.0	58	15	2.1	132	13	0.8	89
NITZSCHIA	CEL					2.6	159			
OOCYSTIS	CEL					X				
OSCILLATORIA	FIL					0.8	53			
PANDORINA MORUM	COL		1.0	58		X				
PEDIASTRUM TETRAS V. TETRAODON	COL					0.4	26			X
PERIDINIUM	CEL	14	1.5	88						
PERIDINIUM QUADRIDENS	CEL					X				
PHACUS	CEL			X						X
PHACUS MEGALOPSIS	CEL					0.8	53			
PTERONOMAS	CEL								0.8	59
SCENEDESMUS ABUNDANS	COL									X
SCENEDESMUS DIMORPHUS	COL		1.5	88		1.3	79			X
SCENEDESMUS QUADRICAUDA	COL			X					0.4	30
SCHROEDERIA SETIGERA	CEL									X
SKELETONEMA POTAMOS	CEL					0.8	53		0.8	59
STEPHANODISCUS	CEL		1.0	58						
SYNEDRA	CEL		0.5	29						
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL					0.8	53		0.4	30
TETRASTRUM STAUROGENIAEFORME	COL								0.4	30
TRACHELOMONAS	CEL								0.4	30
TRACHELOMONAS #1	CEL		1.0	58						
TRACHELOMONAS #2	CEL		1.5	88						X
TRACHELOMONAS CYLINDRICA V. DECOLLATA	CEL									X
TOTAL				5870			6231			7053